IQ250

SIM Technology Ltd.

Table of Contents

Preface 2
1. Specifications 4
2. Working Principles 5
3. Disassembly steps 10
4. Troubleshooting 12
4.1 Diagram of Troubleshooting 12
5. FAQ 14
Repair of failure in baseband 14

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Preface

IQ250 will comply with Android2.2 requirements and also features the GSM850,GSM 900, DCS 1800 ,DCS 1900 quad-bands and WCDMA 3G phone function; Furthermore, it will also support the most advanced multimedia features including WVGA LCD,5.0 mega pixels camera ,MMS, MP3, Micro SD card….

Maintenance services for this product are divided into three levels:

1. Level 1 is for elementary services. With no specialized maintenance tools available, only empirical maintenance service is offered. Usually a heat gun is not required, and an IC problem cannot be solved. IC troubleshooting is offered only when necessary with the manufacturer's permission.
2. Level 2 is intended to solve problems that cannot be solved at level 1. If necessary, specialized maintenance tools can be used such as the heat gun, electric soldering iron, oscilloscope and communications system analyzer. Any element of the phone can be serviced at this level, and the service technicians will try their best to solve various problems.
3. Level 3 is for problems that cannot be solved at level 2. These problems will be solved by the research and development center of the manufacturer.

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Important statement:

The target readers of this service manual are experienced technicians familiar with similar devices. This manual is intended to technically assist electronic and mechanical maintenance. It is suitable for IQ250 Level 2 maintenance technicians. If the problems cannot be solved with the help of this manual, please contact the Customer Support or the Research and Development Center of SIM Technology Ltd. Thank you!

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1. Specifications

Basic product information	Item	Remark
Operating system	Android 2.2FroYo	
Network and radio technology		
Dual-band 7.2M bpsHSDPA	UMTS850/2100, 7.2M bps HSDPA	
Quad band GSM/GPRS/EDGE	GSM Quad-band 850/900/1800/1900MHz, GPRS, EDGE	
Phone factor	Bar type classical Pocket PC	
Size (mm)	105.3*57*13.2mm	
Weight (g)	TBD	
Display (size/resolution/color)	3.2" HVGA TFT LCD	
Touch panel/Touch lens	Yes, Touch Lens (Resistance screen)	
keypad	Front side: N/A left side: volume up/down; top side:Power key	
Main Camera	3M FF	
Sub Camera	N/A	
Bluetooth	Bluetooth 2.1 + EDR	
GPS	Yes	
WiFi (802.11 b/g)	Yes, 802.11b/g	
USB	USB 2.0 high speed, charging/sync	
Battery capacity	1100mAh	
Memory	512MB ROM+256MB RAM	
Expansion memory slot	Micro SD	Supports up to 32 GB
Platform	Qualcomm MSM7227-1	600MHZ
FM radio	Yes, antenna on headset	
Speaker(numbers,handfree)	1 speaker, support handfree	
Network LED (color)	NO	
Vibrator	Yes	
stylus	Yes	
Reset hole	Yes	
Lanyard hole	Yes	
audio jack	Yes, 3.5mm	
Motion Sensor	Yes	
Proximity sensor	Yes	
Compass	Yes	
Talk time	180- 210 mins	
Standby time	<3mA	

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2. Working Principles

2.1 General Description

The hardware frame system of IQ250 base on QUALCOMM MSM7227,the others parts including memory, PMU, WIFI/BT controller and RF Transceiver ,RF PA etc. The basic MSM7227 system solution consists of the MSM7227,RTR6285,and PM7540 ICs. **Figure1-1** is a diagram of the whole hardware system.

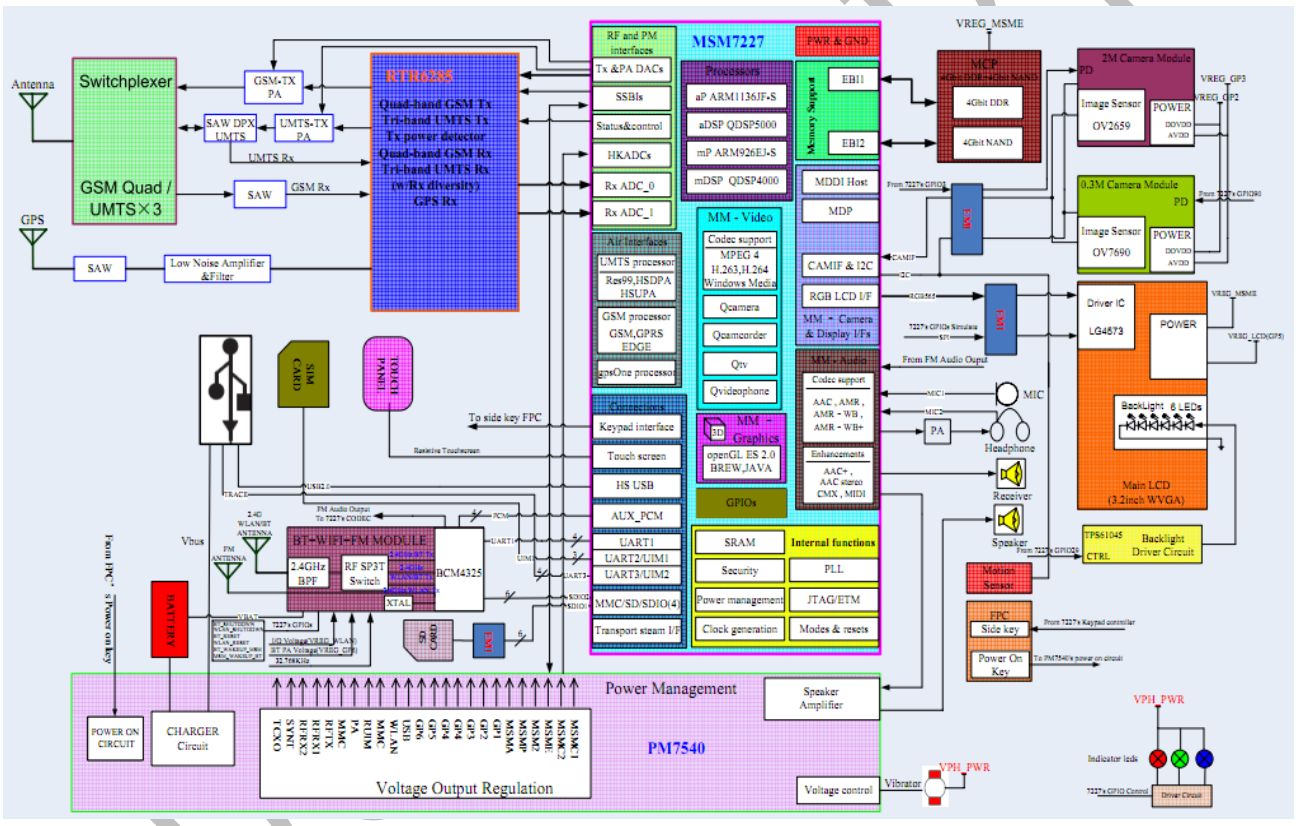

Figure 1-1

2.2 view of the mainboard

Figure 2-2-1 is the frontal view of the mainboard, Figure 2-2-2 is the rear view of the mainboard.

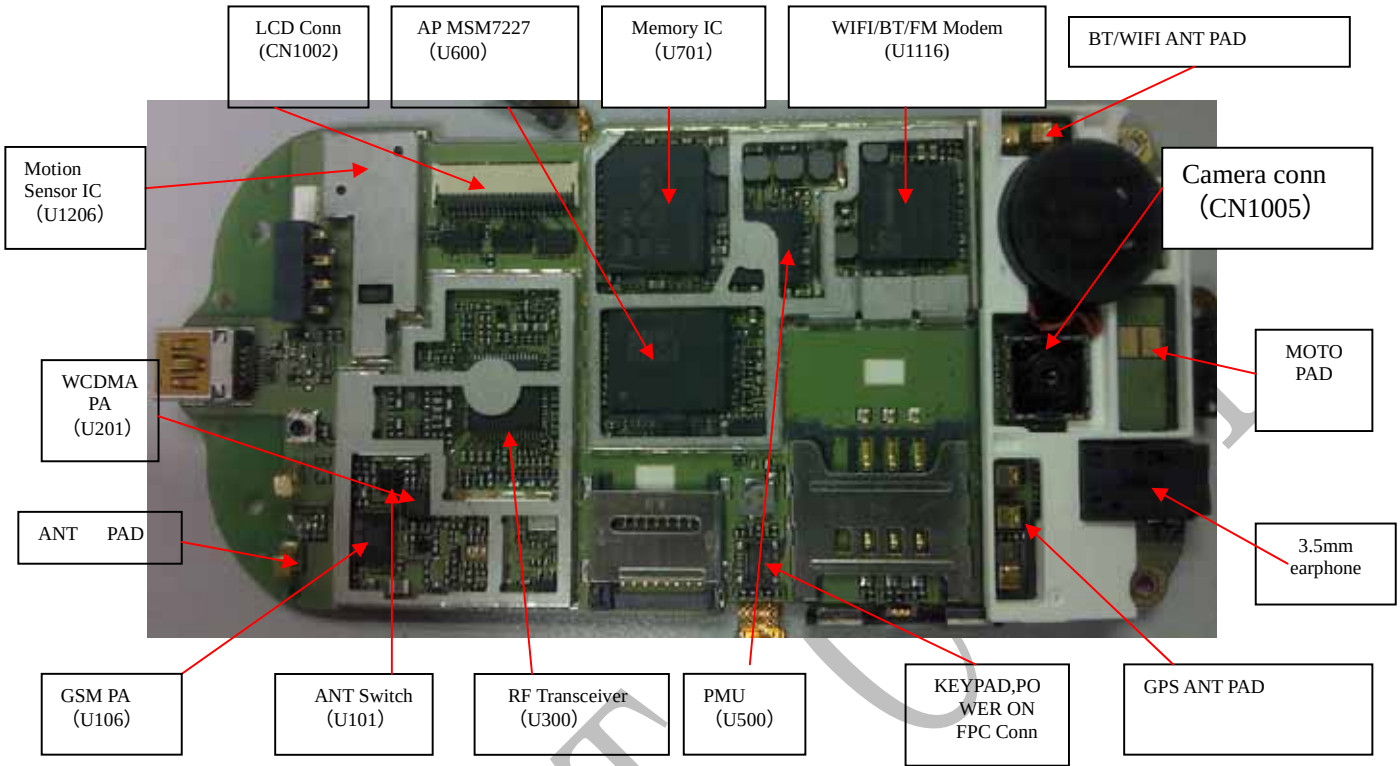

Figure 2-2-1

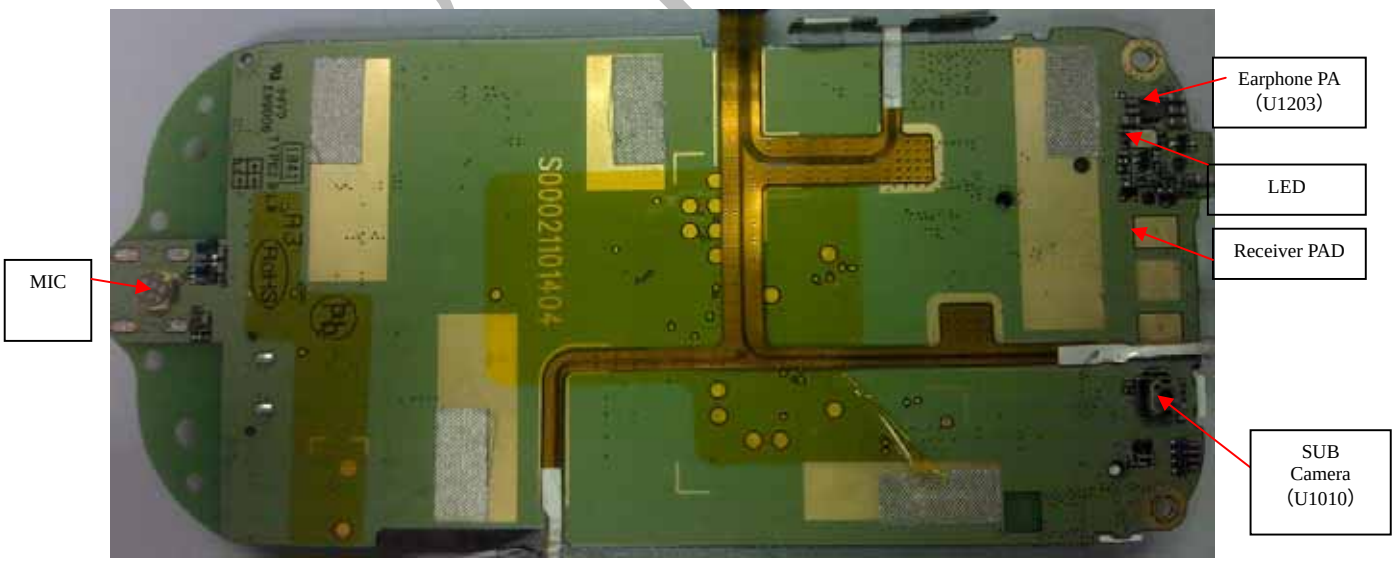

Figure 2-2-2

2.3 Main circuit module

2.3.1 MSM7227

The MSM7227 device is fabricated using the advanced 65 nm CMOS process, and is available in the 12*12*1.05nm,0.4mm pitch,560-pin nano-scale package. The MSM227 device have two cpus: one is High-performance ARM1136JF-S application processor at up to 600MHz,the other is ARM926EJ-S modem processor at up to 400MHz.The QDSP4000 DSP controller also belong to the MSM7227,in charge of audio and video ect.

The core voltage and the interface voltage is seprate in the MSM7227,for low power. The PM7540 is power manage unit , provide the all voltages of the MSM7227 needs.

MSM7227 baseband controller module mainly characteristics as follows:

(1) CPU

- 32-bit ARM1136JF - S core based on CPU;
- working frequency :600MHz;

1. 32KB instruction and32KB data cache.
2. 256 KB ARM11™ L2 cache

(2) MPU

1. 32-bit ARM926EJ - S core based on CPU.
2. Working frequency:400MHz;
3. 32KB instruction and32KB data cache.

(3) External memory interface

- 256KB internal memory for graphics, internal functions, DSP etc.
- Enhanced EBI1 memory support:200MHz bus clock for DDR SDRAM.

(4) USER Interfaces

- Two I2C interfaces;
- Four universal asynchronous receiver transmitter(UART) serial prot:4 个 UART 口;including two high-speed(DM via UART,4Mb/s)
- Two UIM ports.
- Two MMC/SD Card ports;support SDIO.
- graphics hardware acceleration:3D graphics core
- Special camera interface.
- USB 2.0 compliant high-speed USB core with limited OTG capabilities.

The MSM7227 multimedia features as follows:

(1) LCD controller

- Support 8/9/16/18 bits display interface, up to FWVGA;

(2) Audio and Modem CODEC

- Support two stero decoders.
- Audio support: AMR-NB、AAC、AAC+、eAAC+、windows media and more

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- Up to 8-megapixels camera
- 2D/3D image accelerate
- Support video encoding, decoding function, support MP4,H.263,H264,window media V9,real V10
- Support video talk
- Support streaming media
- GPS support MS-assisted,MS-based,MS-assisted/hybrid, and standalone GPS modes.

MSM7227 support agreement:

- Support GSM R99.
- Support GPRS multislot class 12,CS1~4
- Support EDGE multislot class 12,cs1~4,MCS1~9
- Support WCDMA R99
- Support HSUPA ,HSDPA R5, DL 7.2Mbps

2.3.2 Power manage unit: pm7540

The PM7540 device integrates all wireless handset power management, general housekeeping, charge control and user interfaces into a single mixed signal IC.

The power management portion accepts power from common sources---battery, external charger,adater, UAB_VBUS, coin cell backup-----and generates all the regulated voltages needed to power the appropriate handset electronic. It monitors and controls the power sources, detecting which sources are applied verifying that they are within acceptable operational limits, and coordinates battery and coin cell recharging while maintaining the handset electronics supply voltages.

The PM7540 power management module can provide 17 programmable of voltage circuit to produce all sorts of voltage for handset, including 14 uses by IQ250.

Output voltage feature

Name	Voltage	Driver (Max)	In Bounre used for
VREG_MSMC1	1.2V	500mA	Baseband core
VREG_SYNTH	2.85V	50mA	Antenna Switch
VREG_LCD	2.85V	150mA	supply LCD
VREG_RFRX_1	1.8V	300mA	RF RTR6285
VREG_RFRX_0	2.85V	150mA	RF RTR6285
VREG_MSMC2	1.2V	500mA	Baseband core
VREG_MSME	1.8V	500mA	Baseband and Memory
VREG_WLAN	2.85V	300mA	WLAN module
VREG_AUX1	2.85V	300mA	BT PA power of WLAN module
VREG_UIM1	1.8V/3.3V	50mA	UIM
VREG_CAM_ACORE	2.85V	150mA	Camera analog core
VREG_TFLASH	2.85V	150mA	T-FLASH 卡
VREG_CAM_DCORE	2.85V	150mA	Camera digital core

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VREG_TCXO	2.85V	50mA	TCXO

2.3.3 RTR6285 RF TRANSCEIVER IC DEVICE

The RTR6285 device is a highly integrated radio frequency CMOS transceiver IC.

The RTR6285 device support E-GSM/900/DCS1800/PCS1900MHz/WCDMA 2100MHz four bands signal paths, including transmit circuit, receiver circuit, frequency synthesis circuit, RF and related control circuit.

The GSM/EDGE Rx paths start from the handset front-end circuits (GSM Rx filters and antenna switch module). The four differential inputs through Low-Loss Dual Band Filter enter receiver module of RTR6285. The downconverted baseband outputs are multiplexed and routed to lowpass filters whose passband and stopband characteristics supplement MSMA device processing. The transmit path begins with differential baseband signals from the MSM device. These analog input signals are buffered, filtered by low-path filter, corrected for DC offsets, amplified, and then applied to the quadrature upconverter mixers.

IC features:

- Multiband ,multimode operation: UMTS 800/850/900, UMTS 1700/ 1800/1900/2100, GSM/EDGE 850/900/1800/1900
- UMTS Diversity
- GPS
- GPRS/EDGE compliant
- Direct frequency conversions from analog baseband to RF and vice versa
- Dedicated ZIF RF-to baseband quadrature downconverters
- Dedicated ZIF baseband-to RF quadrature upconverters
- RF AGC amplifiers, filter, and driver amplifier
- Dedicated gain control circuits
- Bias control circuits
- Integrated power detector
- Integrated thermomter
- Single-line serial bus interface(SSBI)
- Selective circuit power-down
- Available in a small, thermally efficient package

2.3.4 GPS

RTR6285 integrated GPS receiving module. With LNA ALM-1412 together can achieve GPS function.

2.3.5 BT/WIFI IC:

AW-GH600A is AzureWave Technologies, Inc.'s product, which integrated WIFI/BT/FM module.

General key features:

- Integrates Broadcom solutions of BCM4325 WIFI/BT/FM SoC;
- SDIO interfaces support for WLAN;
- High speed UART and PCM for Bluetooth and FM
- I2C interface for FM
- FM line-level analog stereo output available
- FM subsystem control through Bluetooth HCI interface
- Flexible Power Supply(2.3v-5.5v)
- Multiple power saving modes for low power consumption

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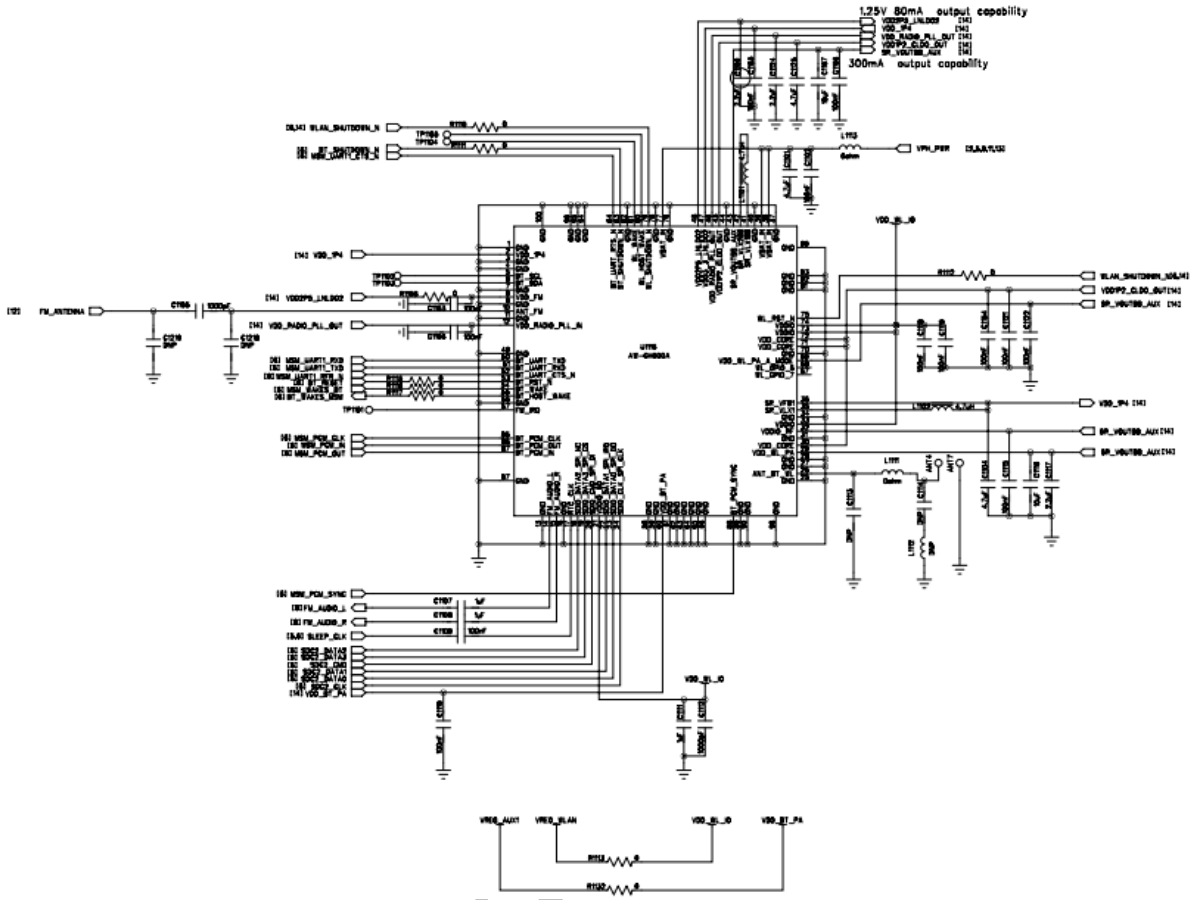
The detail circuit see belw:



3. Disassembly steps

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I Introduction to disassembly tools

1. Anti-static protection: high resistance anti-static bracelets/gloves and clothes must be worn;
2. Prepare disassembly tools: Tweezers, screwdriver T5

II. Overall introduction to the phone structure

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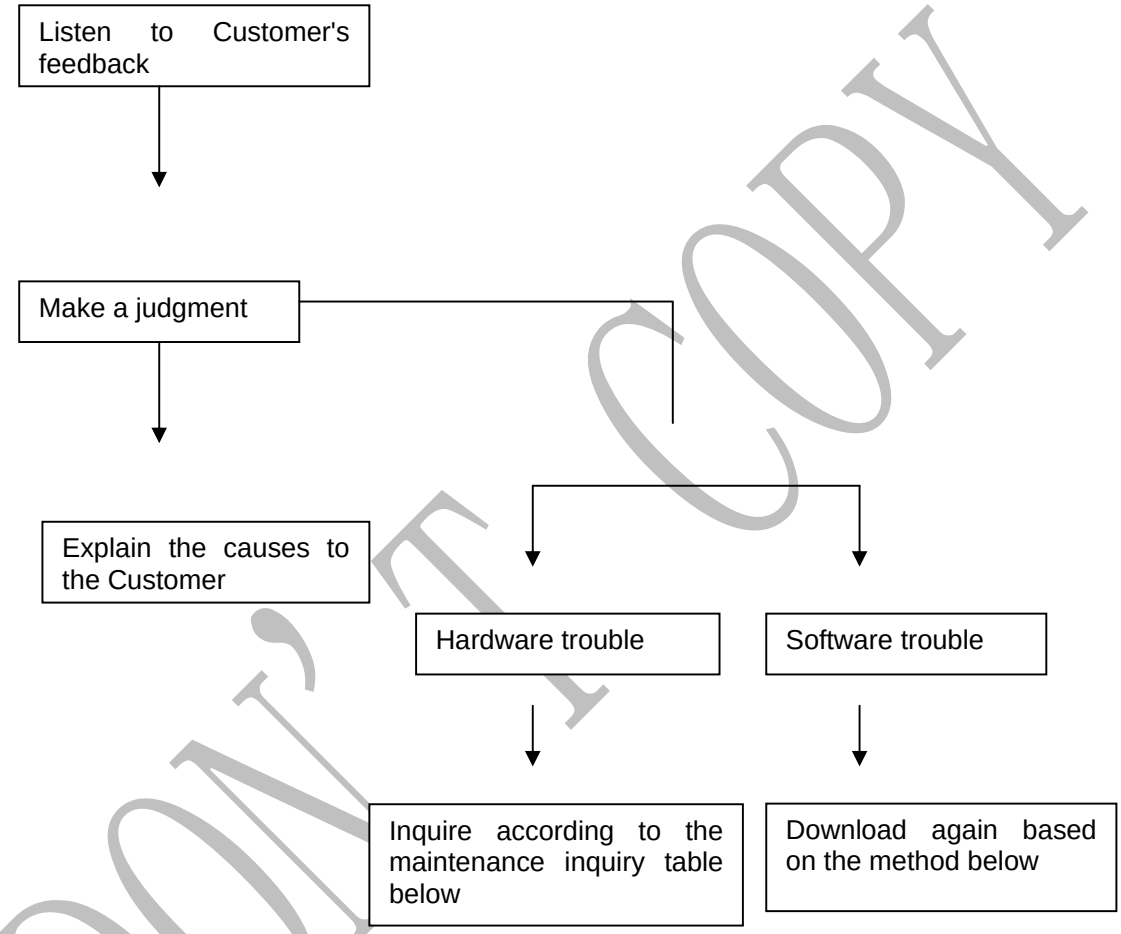
4. Troubleshooting

4.1 Diagram of Troubleshooting


Listen to Customer's feedback
Make a judgment
Explain the causes to the Customer
Hardware trouble
Software trouble
Inquire according to the maintenance inquiry table below
Download again based on the method below

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Note: Any brand new problem that is encountered has to be solved based on the technician's experience. The troubleshooting list contains the known faults of the ET960, which is for Level 1 service reference. **Special Notice: Before repairing the mainboard, please check to see whether or not there are missing, displaced or damaged components.**

4.1.1 Chips and elements inside the mobile phone are driven by weak currents, so the maintenance should not be performed within a magnetic field or with high voltage to avoid possible damage caused by heavy current.

4.1.2 When troubleshooting the mobile phone, follow the general operation rules. Firstly the measurement meters should be correctly connected. Then turn on and properly configure the meter. The type of the fault should be

initially determined as well as the possible extension of the fault.

4.1.3 The mobile phone is an integrated microelectronics product with delicate elements inside, so the service technician should get familiar with the chips/elements and their specifications before any troubleshooting operation, with the logic between the chips clear in mind. During the troubleshooting, circuit analysis, careful inspection, correct judgment, as well as quick and accurate operation are required to prevent any man-made malfunction and economic loss. Repair operations should be performed after the type of the fault has been confirmed.

4.1.4 Final testing or calling on trial

Final testing or calling on trial are performed to check whether the mobile phone can operate normally again.

4.2 Fault Identification

The IQ250 posed of many parts, including the mainboard, tone chamber antenna module, LCD module and battery. Among them, the mainboard is the core of the system. Speaker ,motor and receiver are connected with the mainboard by means of pressure welding. The microphone is of SMT type and is soldered onto the keypad. The LCD is connected to the mainboard through the FPC connector.

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5. FAQ

Repair of failure in baseband

Failure in the beginning of the production line

Fail to turn on the phone or to write SN:

Can not turn on the phone, Please check as the following steps:

1:Power on the main board and do not turn on the phone, check if the current of the main board is less than 200uA or not.

2: Press the turn-on key and start the system, the current should vary between 100mA and 200Ma.

If the current is high , please check if these main components (such as MSM7227、Memory、PM7540 PA) are SMT fail. Then check connectors for any possible pseudo soldering、short circuit、 improper soldering and so on.

If the current is normal, please check as the following:

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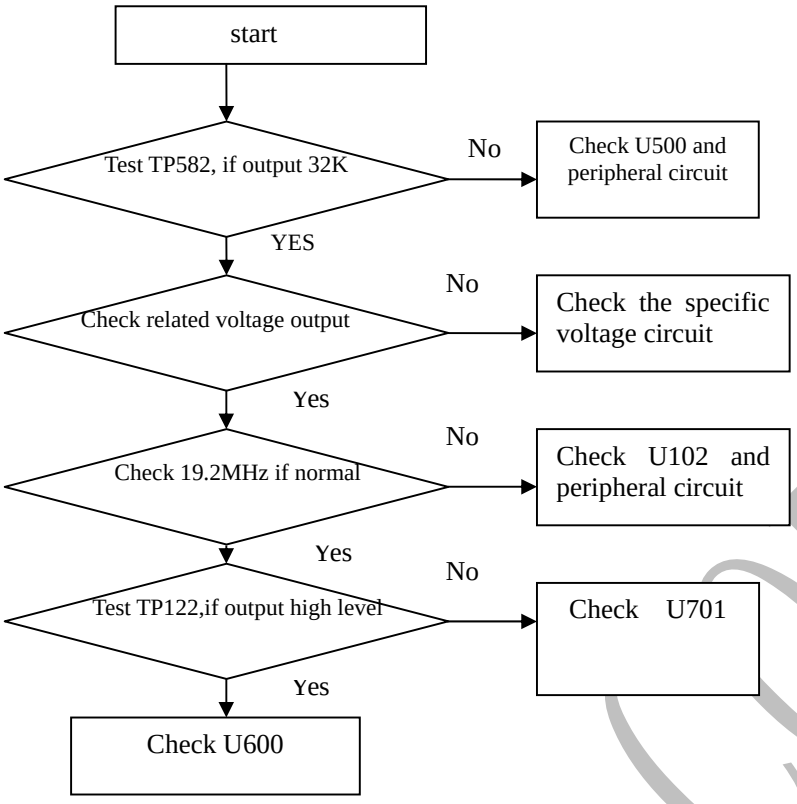

figure 12 power on fail processing flow chart

Fail to write the SN. Please check soldering of the usb connector

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Failure of function in main board

LCD display

If the LCD of IQ250 display is not normal, please check and repair as the following steps. turn on the phone and the inner screen is black, please check the back light circuit. If the outer screen dose not work, check the screen and connectors.

Firstly , check the LCD and check the connector to main board for reliability. Testing the circuit by replacing the LCD.

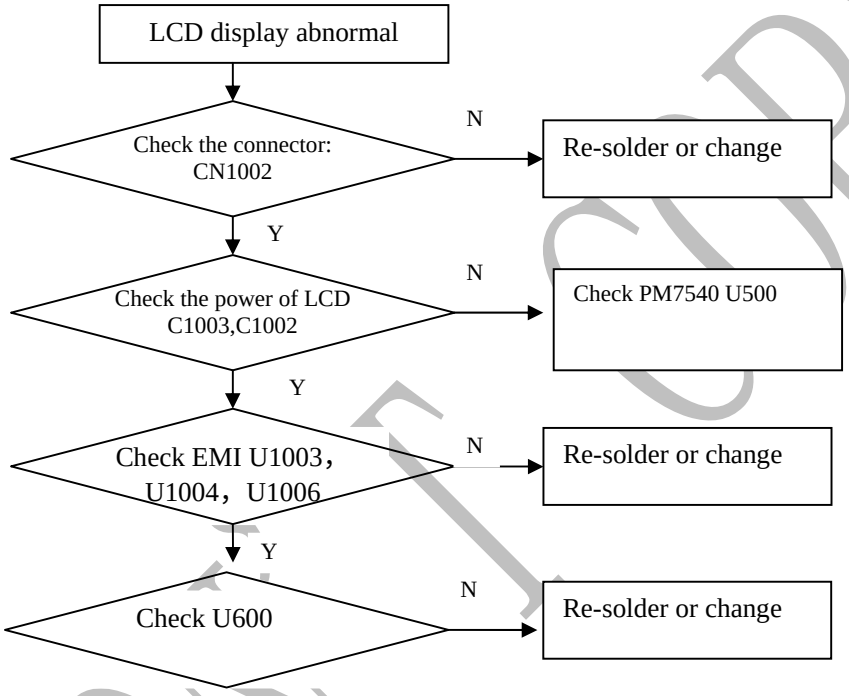

figure 13 display abnormal processing flow chart

Turn on the phone and the screen is black, then the circuit of black light may be abnormal.

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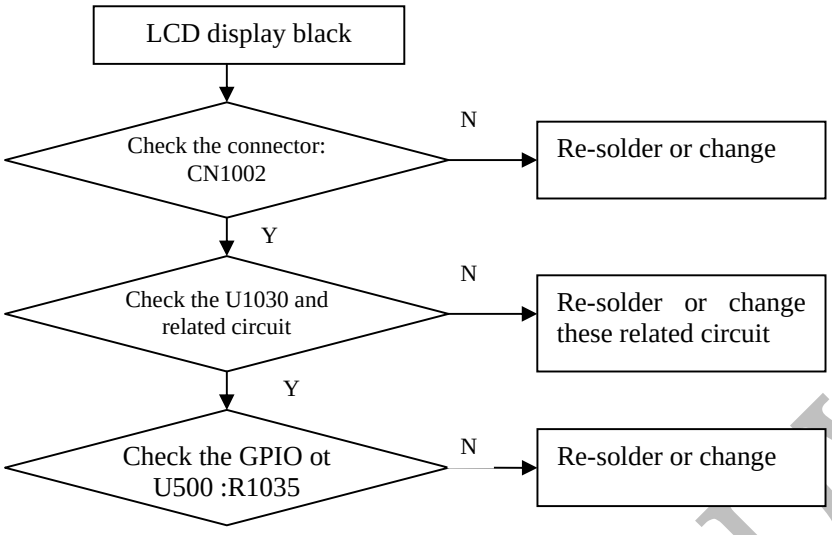

figure 14 the LED of LCD fail processing flow chart

motor

If the motor does not vibrate or vibrate abnormally, repair as the following:

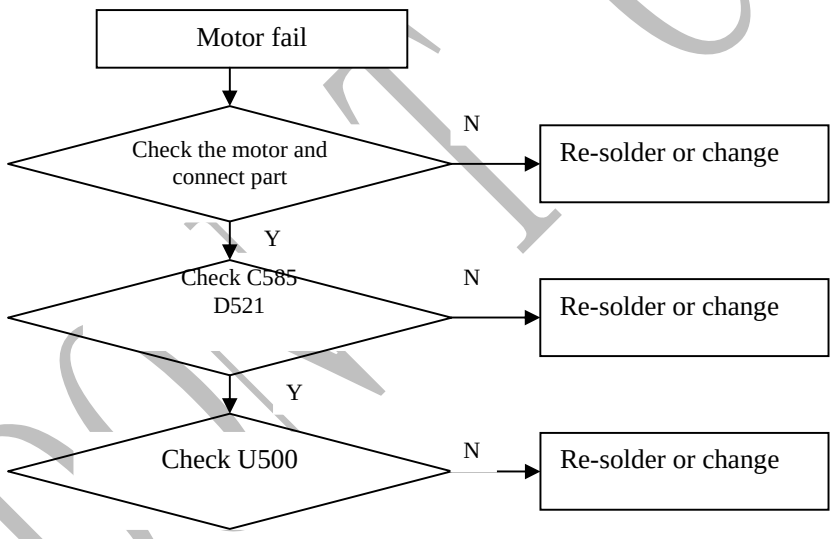

figure 16 motor fail processing flow chart

speaker

If the speaker has no sound, firstly, check if mute mode is set or not. If not, repair as the following. If the sound of the speaker is abnormal, repair as the following:

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Replace the speaker, and check again. Check C954,C956,D951,D952,L951,L952 form soldering and breakdown. It's necessary for replacement.

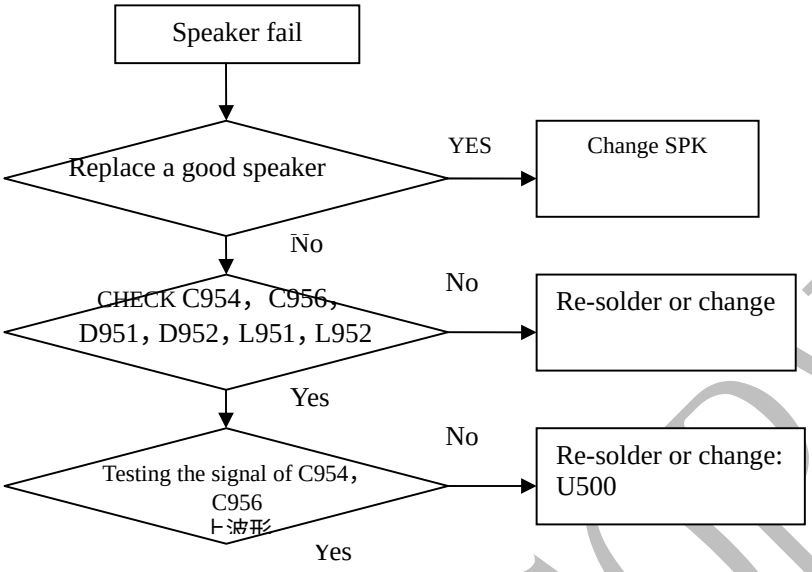

Figure 17 SPK fail processing flow chart

receiver

Dial 112 and fail to hear a voice or the earphone has no sound in testing mode. Repair as the following steps.

Check if the earphone is damaged. Test by replacing the earphone. Check the relating circuit for losing components.

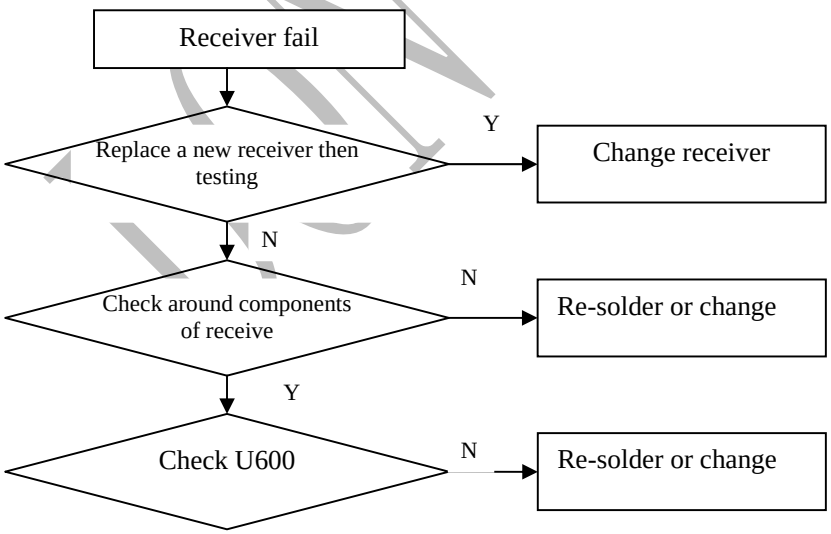

figure 18 receiver fail processing flow chart

MIC

Fail to record or work abnormally in testing mode. Repair as the following.

Check the mic for improper soldering or replace the microphone and test.

Check the relating circuit for losing components, welding bad.

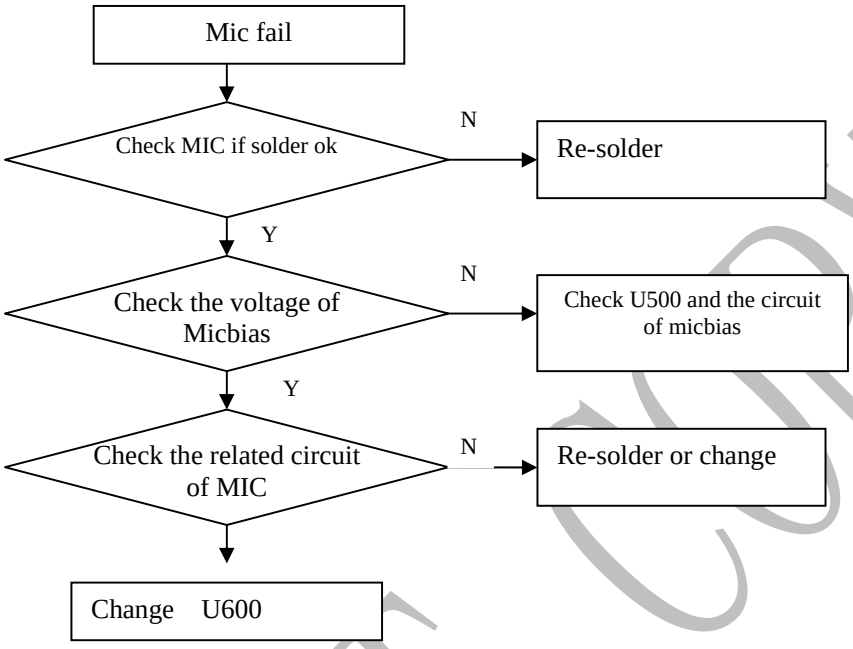

Figure 19 MIC fail processing flow chart

EARPHONE

If the earphone can not be tested normally when inserting and pulling out or if the earphone can not hear a voice, or if the microphone or the receiver or the keypad work abnormally, repair as the following:

Check the soldering of the earphone's socket for reliability. check the relating circuit for losing components, welding bad .

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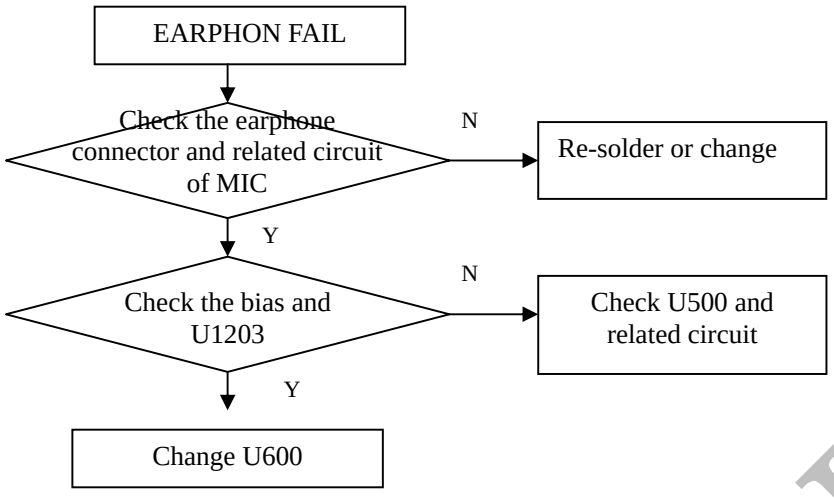

Figure 20 earphone fail processing flow chart

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